

**United States Patent [19]**

Yamashita et al.

**[11] Patent Number:** 5,554,871**[45] Date of Patent:** Sep. 10, 1996[54] SEMICONDUCTOR DEVICE HAVING MOS  
TRANSISTOR WITH NITROGEN DOPING

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257/410; 257/411; 257/900[58] Field of Search 257/408, 900,  
257/336, 344, 410, 411

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## [57] ABSTRACT

An MOS transistor capable of improving hot carrier resistance and a method of manufacturing thereof are provided. In the MOS transistor, nitrogen is introduced in a sidewall oxide film, so that a concentration distribution of nitrogen in a section perpendicular to the main surface of a semiconductor substrate in the sidewall oxide film has a peak at the interface between the semiconductor substrate and the sidewall oxide film. As a result, an interface state at the interface between the sidewall oxide film and the main surface of the semiconductor substrate is suppressed, resulting in decrease of the probability at which hot carriers are trapped in the interface state. Accordingly, the hot carrier resistance is improved.

14 Claims, 32 Drawing Sheets

